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Application No. 10/532,398
After Final Office Action of October 29, 2008

Docket No.: 0365-0627PUS1

AMENDMENTS TO THE CLAIMS

1. (Previously Presented) A process for manufacturing transglycosylation products, comprising the steps of:

- reacting a starch ester or starch ether at acidic conditions with an alkanol containing 1 to 6 hydroxyl groups in the presence of an acidic catalyst in a transglycosylation reaction to form a reaction mixture, wherein said acid catalyst comprises phosphorous, and

- recovering a transglycosylation product, or subjecting the transglycosylation product to further processing,

characterized in that

- the reaction is performed in a reactive extrusion process essentially without any medium, and

- the reaction mixture is conducted through an extrusion device via at least two separately adjustable heating zones, thereby providing control of heat introduced externally into the reaction mixture,

wherein the acidic catalyst is a phosphorus-containing acid selected from at least one of the group consisting of: phosphoric acid, H_3PO_4 , hypophosphorous acid, H_3PO_2 , and phosphorous acid, H_3PO_3 , and

wherein the catalyst is allowed to chemically bond with the transglycosylation product.

2-4. (Cancelled)

5. (Previously Presented) The process according to claim 1, wherein the extrusion temperature is within the range of approximately 105 to 200 °C.

6. (Previously Presented) The process according to claim 1, wherein prior to the transglycosylation reaction, the alkanol and the acidic catalyst are mixed together to form a first reaction mixture, thereby producing an aerosol, wherein the aerosol is added to the starch derivative at a dose corresponding to a desired molar mass of the transglycosylation product to produce a pre-mixture.

7. (Previously Presented) The process according to claim 6, wherein the amount of the alkanol is approximately 0.01 to 20 weight-%, of the mass of the starch ester or the starch ether, and wherein the amount of the alkanol is approximately 0.0005 to approximately 5 mole-% of the amount of the starch ester or the starch ether.

8. (Previously Presented) The process according to claim 6 or 7, wherein the alkanol and the acidic catalyst are supplied in aerosol form to a fluidised-bed mixing device, wherein the alkanol and acidic catalyst are mixed with a powdery starch derivative to produce the pre-mixture.

9. (Currently Amended) The process according to claim 6, wherein the concentrations of the alkanol and the acidic catalyst and of any liquid chemicals are selected such that the total amount of liquid is less than 30 % wt-% of the dry matter content of the pre-mixture.

10. (Previously Presented) The process according to claim 5, wherein the reaction mixture is compacted yielding a compacted pre-mixture, prior to supplying the reaction mixture to the extrusion device.

11. (Previously Presented) The process according to claim 10, wherein the compacted pre-mixture is supplied to the extrusion device to serve as the reaction mixture, wherein the extrusion device is either a 1- or 2-screw type extrusion device.

12. (Previously Presented) The process according to claim 1, wherein the starch ester or starch ether comprises a product manufactured from native starch by means of oxidizing, hydrolyzing, cross-linking, cationizing, grafting, etherification or esterification.

13. (Cancelled)

14. (Previously Presented) The process according to claim 1, wherein the alkanol is a lower alkanol with 1 to 6 carbon atoms and 1 to 5 hydroxyl groups.

15. (Previously Presented) The process according to claim 14, wherein the alkanol is selected from at least one of the group consisting of: methanol, ethanol, n-propanol, isopropanol, n-butanol, sec butanol, methoxy ethanol, ethoxy ethanol, methoxy methanol, ethoxy methanol, ethylene glycol, propylene glycol and glycerol.

16-21. (Cancelled)

22. (Previously Presented) The process according to claim 1, wherein the extrusion temperature is within the range of approximately 110 to 190 °C.

23. (Previously Presented) The process according to claim 6, wherein the amount of the alkanol is approximately 0.1 to 10 weight-% of the mass of the starch ester or the starch ether.

24. (Previously Presented) The process according to claim 6, wherein the amount of the alkanol is approximately 0.002 to approximately 2.0 mole-% of the amount of the starch ester or the starch ether.

25. (Previously Presented) The process according to claim 6, wherein the amount of the alkanol is approximately 0.015 to 0.3 mole-% of the amount of the starch ester or the starch ether.

26. (Previously Presented) The process according to claim 6, wherein the concentrations of the alkanol and the acidic catalyst and of any liquid chemicals are selected such that the total amount of liquid is approximately 5 to 25 % wt-% of the dry matter content in the pre-mixture.

27. (Previously Presented) The process according to claim 5, wherein the reaction mixture is compacted and granulated prior to feeding it into the extrusion device.

28. (Previously Presented) The process according to claim 1, wherein the alkanol is a lower alkanol with 1 to 6 carbon atoms and 1 to 3 hydroxyl groups.

29. (Previously Presented) The process according to claim 14, wherein the alkanol is selected from the group consisting of: a substituted lower alcohol, an alcohol containing two hydroxyl groups, and an alcohol containing three hydroxyl groups.

30. (Canceled)